

due to the fact there are no bracket arch wire slots made in the field that are large enough to receive an .027" wire. A person of ordinary skill in the art would not find a wire .027 inch obvious. In fact they could not even imagine a .027 inch wire because the arch wire of Wool must fit within a bracket slot which has a maximum size of .022 inch. C

Applicant claims an arch bar that is "attached to a fixed orthodontic appliance by piggybacking on the labial side of an installed orthodontic appliance."

However, Examiner contends that it is not clear how the arch bar can be fixed to said appliance by piggybacking on an installed orthodontic appliance as written in the claim language since it is not disclosed whether the two appliances are distinct - i.e. how piggybacking the arch bar to an installed appliance can attach it to a supposedly separate fixed appliance.

See below.

Applicant remarks that the terms "fixed orthodontic appliance" and "installed orthodontic appliance" are synonymous,

It is well known by an expert of ordinary skill in the art of orthodontics that the terms are synonymous.

even though the claim language, as written, clearly positively claims each appliance as though they are separate and distinct.

1. (currently amended) An accessory arch bar attached to a **fixed orthodontic appliance** by piggybacking on the labial side of an **installed orthodontic appliance** used during orthodontic treatment comprising:

a metal wire with a longitudinal body having opposing longitudinal ends, a cross-sectional diameter, and a longitudinal axis wherein the longitudinal body is straight which becomes curved when placed on the orthodontic appliance which creates a dental arch widening as the wire longitudinal body tries to return to a straight configuration;

a cross-sectional diameter of ~~0.020~~ .025 in. to .60 in.;

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance; and

a tying means for attaching the accessory arch bar to an **orthodontic appliance** wherein a wire ligature or an elastomeric orthodontic module is used to attach the accessory arch bar to an orthodontic arch wire or directly to orthodontic brackets.

The specification and drawings clearly disclose the multiple terminology and the fact they refer to a single appliance commonly termed "braces". (One more term.) I would accept the examiner's suggestion that the claims be amended using a single term.

In each independent claim of the Present invention, Applicant has failed to

structurally differentiate between an arch wire versus an arch bar aside from the claimed dimensional differences - of which an arch wire can also have.

An arch wire does not have to be separately differentiated from an arch bar in the claims. An arch wire is an integral part of the fixed/installed orthodontic appliance (braces). The arch bar is clearly accessory/piggybacked to the braces, which distinguishes the arch bar from the braces, which would distinguish the arch bar from the arch wire, which is part of the braces.

An arch wire cannot have the dimensional differences that an arch bar can. This has been extensively discussed. The arch wire must fit within the bracket slot which has a maximum size of 0.022 inch.

Applicant has also further clarified what is meant by the term 'fixed orthodontic appliance' as being "comprised of brackets, arch wires and ties." However, support for this assertion is not present in Applicant's specification or claims, wherein one is led to interpret an orthodontic appliance as being a singular component, such as an arch wire for example.

This assertion is clearly in the specification. Detailed Description of the Invention lines 7-9: "As shown in Fig. 2 an orthodontic appliance is **comprised of brackets** 10 placed on the outer surface of the patient's teeth 12. An **arch wire** 11 is connected to the brackets 10 and in place with **ties** 13 which can be metal wire or elastomeric eyelets".

Note the next line: "In Fig. 3 the accessory arch bar 1 is shown attached to the orthodontic appliance using the same ties 13 which ligate the arch wire to the orthodontic brackets 10".

Support is given to this interpretation in Applicants claim language: "a tying means .. used to attach the accessory arch bar to an orthodontic arch wire or directly to orthodontic brackets."

Note the immediately above quote from the specification. It is clearly stated the tying means may be shared. Accessory (see prior discussion of preamble), a metal wire, a cross-sectional diameter, a longitudinal length and a tying means are all elements of the accessory arch bar. This is also clearly disclosed in the drawings and specification.

Each element is separately positively claimed by Applicant, thus further confusing the matter of what said 'fixed orthodontic appliance really is.

As disclosed in the specification and drawings, the fixed appliance also contains a tying means which may be shared.

Furthermore, Examiner does not understand how the terms "piggybacking" and "accessory" can be "synonymous" when read contextually within the claim. The term "accessory" describes the purpose of the arch bar, whereas the term "piggybacking" describes how the "accessory arch bar" is attached to the orthodontic appliance.

The following is from the last response:

In the claim changes in the last office action the word **piggybacked** was added. This was not new matter. Note in the Summary of the Invention, [0004], line 3: "The arch bar **piggybacks** the orthodontic arch wire....." x "Piggybacking" was added to claims 1,7, 13, 19 and 25 to clarify the position of the accessory bar. The preamble in claims 1,7, 13, 19 and 25 describes the arch bar as an "accessory" arch bar which is a structural limitation for the arch bar. Merriam-Webster dictionary defines **accessory** "as a thing of secondary or subordinate importance: *adjunct*. An object or devise not essential in itself, but adding to the effectiveness of something else: *supplementary*. Piggyback is defined as "to set up or cause to function in conjunction with something larger or more important; to function on the back of another". In the context of the present application, **accessory** and **piggyback** are **synonymous** terms. A claim preamble may have a structural limitation. A claim preamble has the importance that the claim as a whole suggests for it. Bell Communications research, Inc. v. Vitalink Communications Corp., 55 F. 3d 615, 620, 34 USPQ 2d 1816, 1820 (Fed. Cir. 1995). When the patentee uses the claim preamble to recite the structural limitations of his or her claimed invention, the Patent Office and Courts give effect to that usage. Corning Glass Works v Sumitomo Elec. U.S.P.S., Inc. 868 F. 2d at 1257, 9 USPQ 2d. at 1966.

Not every rewording of the disclosure will be considered to introduce prohibitory new matter. As stated by the CCPA, "[a] subsequent clarification of or a change in an original disclosure does not necessarily make that original disclosure fatally defective. In re Nathan, 328t 2d 1005, 140 USPQ 601,603 (C.C. P.A. 1964. For example, mere rephrasing of a passage where the same meaning remains intact is permissible. In re Anderson, 471 F. rd 1237, 176 USPO 331, 336 (C.C.P.A. 1973) (word **containing** in claim changed to **carrying**). Similarly, the inclusion of a dictionary or technically recognized definition at the time of filing an application would not be considered new matter if these definitions are inserted in the application subsequent to filing.

The specification uses several adjectives to describe the orthodontic appliance which is fixed to the teeth as opposed to a removable orthodontic appliance:

Notice in the definition of piggyback: "to set up or cause to function in conjunction with something larger or more important; to function on the back of another". The word function is used twice. Notice the definition of accessory describes function without using the word function. The terms are synonymous.

The remark by Applicant that said terms are "synonymous" is not supported in the specification.

The specification does support the fact the terms are synonymous. The most obvious example is lines 1-2 of the Detailed Description of the Invention: "Referring to Figs. 1-13 the accessory arch bar 1 is a wire of sufficient length to be attached, **or piggybacked** to an installed orthodontic arch wire 11.

Note "installed orthodontic arch wire". As discussed, the drawings and specification clearly disclose the orthodontic arch wire as an integral part of the fixed orthodontic appliance.

Lastly, Applicant remarks that Examiner is incorrect in his assertion that "applying torque to a component is the same as applying force in such a way as to produce rotation or torsion." However, an understanding of physics teaches us that torque is a force that produces or tends to produce rotation or torsion" (Merriam-Webster dictionary). Terms such as torsion and torque are commonly used by those having ordinary skill *in* the field of orthodontics.

The patent attorney is also the inventor and has practiced orthodontics for 40 years. The term torsion is not a term commonly used in orthodontics. The term **torque** in the field of orthodontics is a **term of art**.

Lateral x-ray head films are universally used in the field. Below is a tracing of a lateral X-ray of a patient's head from a side view. The anterior, or front, teeth are shown in the view. The crown and root of the front teeth are shown. The front tooth has a longitudinal direction. Certain landmarks on the lateral head film are traced and their positions and angles are measured and compared with known standard measurements. This is called a cephalometric analysis. The Steiner Analysis is a common one used.

The upper front tooth, as described above, has a longitudinal direction norm value of 22 degrees torque. This **particular direction of a tooth is called torque**. In other words, torque is the **labial-lingual angulation of the long axis of a tooth when viewed from a mesial-distal view**. This meaning is universal in the field of orthodontics. The term torque up to this point in the discussion does not involve any forces, it is an angular position of a tooth.

Returning to the upper front tooth, envision a patient with only 10 degrees torque and

the treatment goal is 20 degrees torque. The root tip (includes the rest of the tooth) must be tipped inwards (the entire tooth is angled inwards). Torquing forces must be used to achieve this goal. Now we are talking about force, but is it torsional force, as the examiner describes, applied by a wire? Not necessarily. Torquing springs have been widely used in the field of orthodontics to apply torquing pressures upon the teeth. These springs don't have a torsional force as the examiner describes above.

To make things more confusing-- what is a rectangular arch wire with 10 degrees torque? The wire is rectangular in cross-section. If the arch wire is placed on a flat surface and the anterior portion of the wire is gripped with a pair of pliers the long axis of the pliers would be 10 degrees to the flat surface. The bracket slot is also rectangular in cross-section. When the 10 degree torque arch wire is placed in the bracket slot this will place torquing pressure upon the anterior teeth. In this instance, the wire has a twisting force which is closer to the examiner's definition of torque. To make it more complicated, this wire does not result in a rotational or torsional force applied to the tooth.

The shape of a bracket, i.e. a bracket having vertical slots versus a bracket having horizontal slots, does not change the way a torquing force is applied to said bracket once an arch bar or an arch wire is secured thereto,

Now we are really into the art and history of orthodontics. The shape of a brackets have a huge affect upon the torque angulation of the teeth. Early orthodontic brackets were mainly horizontal and designed to receive round x-sectional wires. These appliances had little or no effect upon the torque angulation of the teeth. Enter vertical slots and wires in an attempt to control the torque angulation of the teeth. Difficult to control the forces. Enter the father of orthodontics, Edward Angle, who designed a wire rectangular in cross-section and a bracket slot rectangular to receive it. He placed the wire on edge and called it "edgewise" braces. Enter modern orthodontics with very effective control over the torque direction of teeth.

The arch bar in the present invention does not engage the bracket rectangular slot, therefore can have no effect upon the torque angulation of the teeth.

since either said bar or wire are statically secured to the bracket and become essentially one component when assembled.



The arch bar does not be part of the fixed orthodontic appliance as an expert of ordinary skill in the art would define an orthodontic fixed appliance.

The following set of photographs may be helpful.

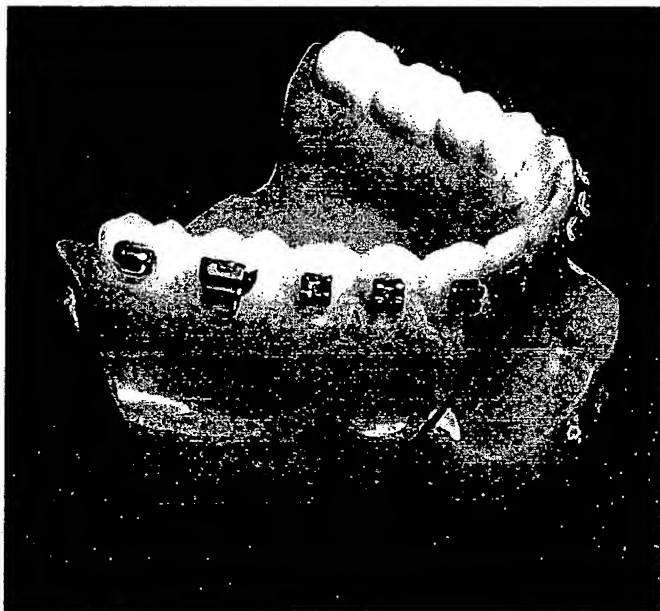


Photo 1 Close up of a bracket with arch wire slot and tie wings.

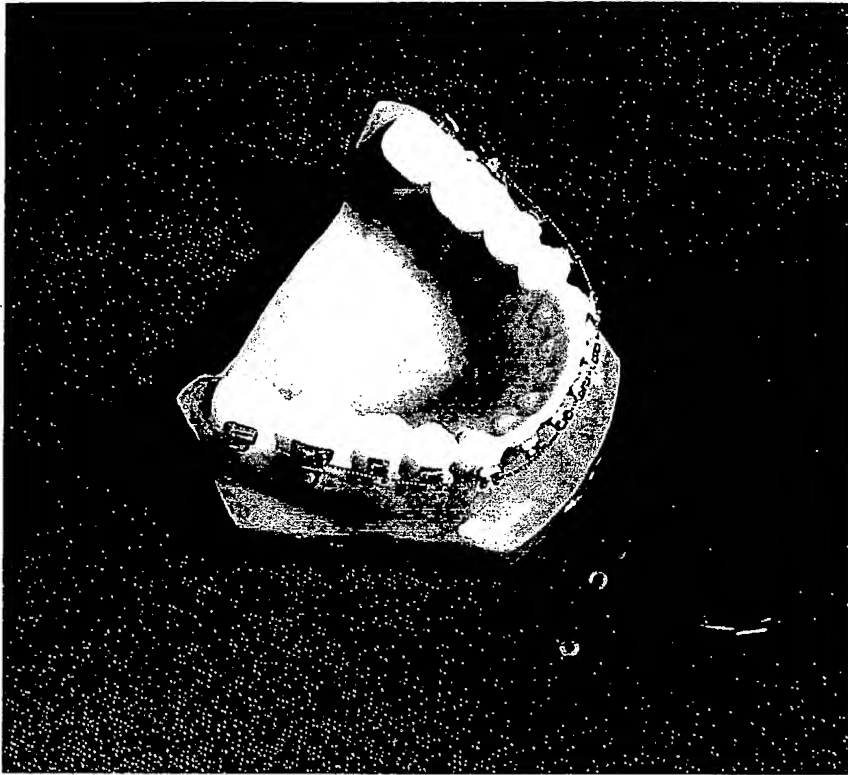


Photo 2. Brackets and tubes are shown attached to the teeth. An arch wire is shown and two tying means are shown, elastomeric ties and ligature wires. This is the composition of a fixed orthodontic appliance (braces/attached orthodontic appliance).

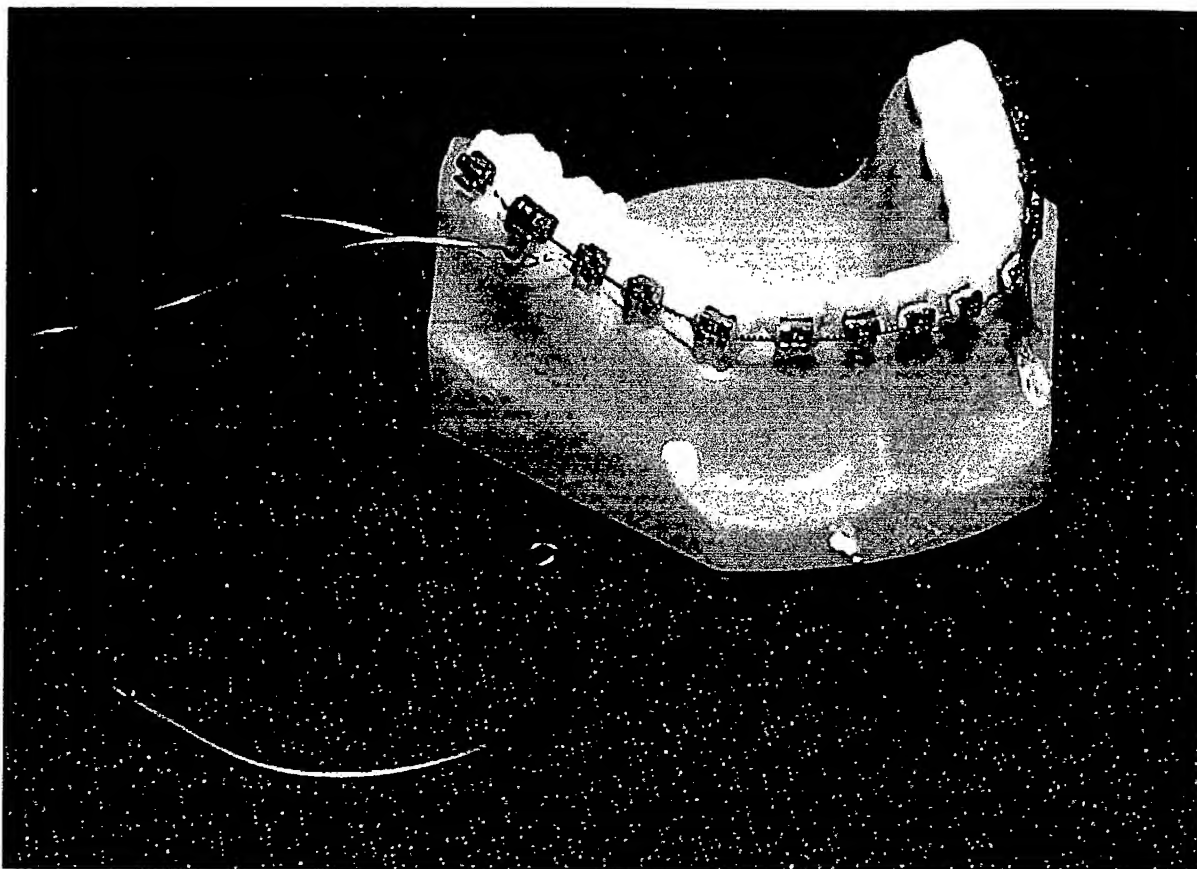


Photo 3. Assembled fixed orthodontic appliance (braces/attached orthodontic appliance).
Note elastomeric ties and wire ligature tie.

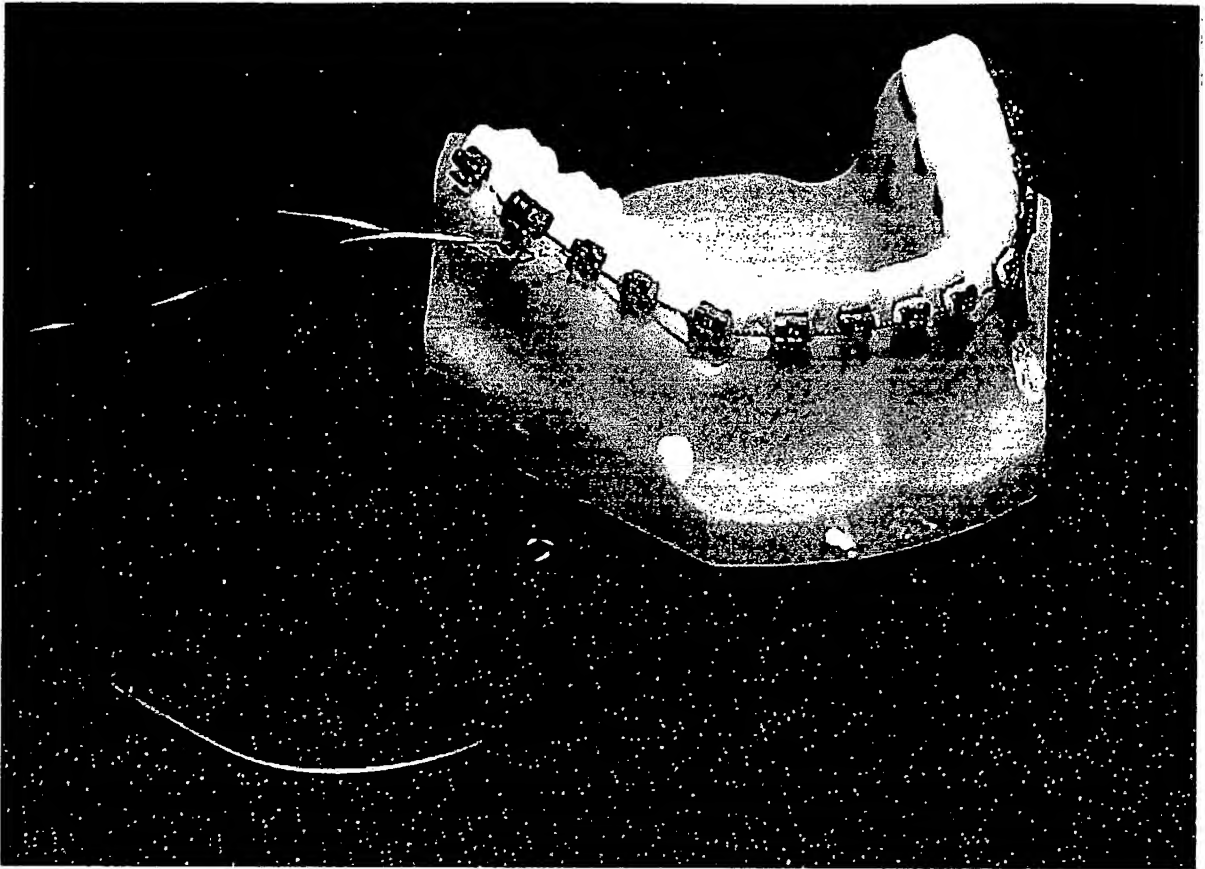


Photo 4. Arch bar before installation.

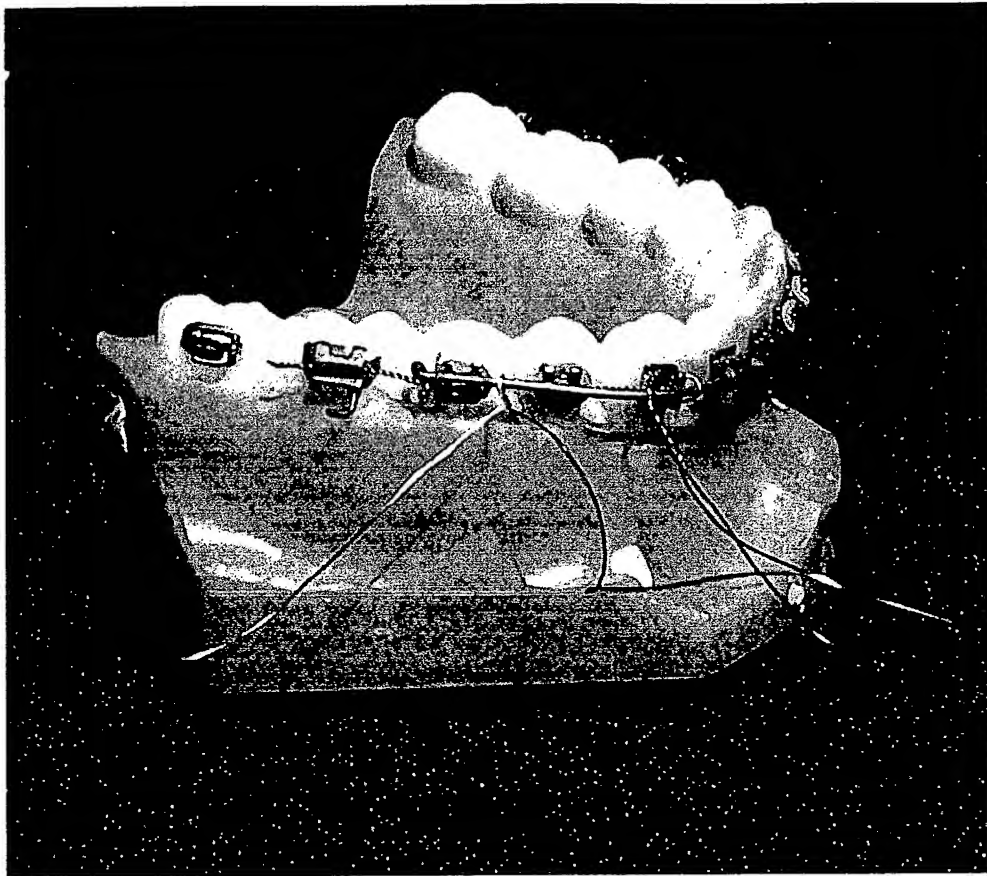


Photo 5. Arch bar and fixed orthodontic appliance. Notice different ways arch bar is attached: (1) tied to arch wire, (2) tied to bracket sharing ligature tie with arch wire and (3) tied to bracket sharing elastomeric tie with arch wire.

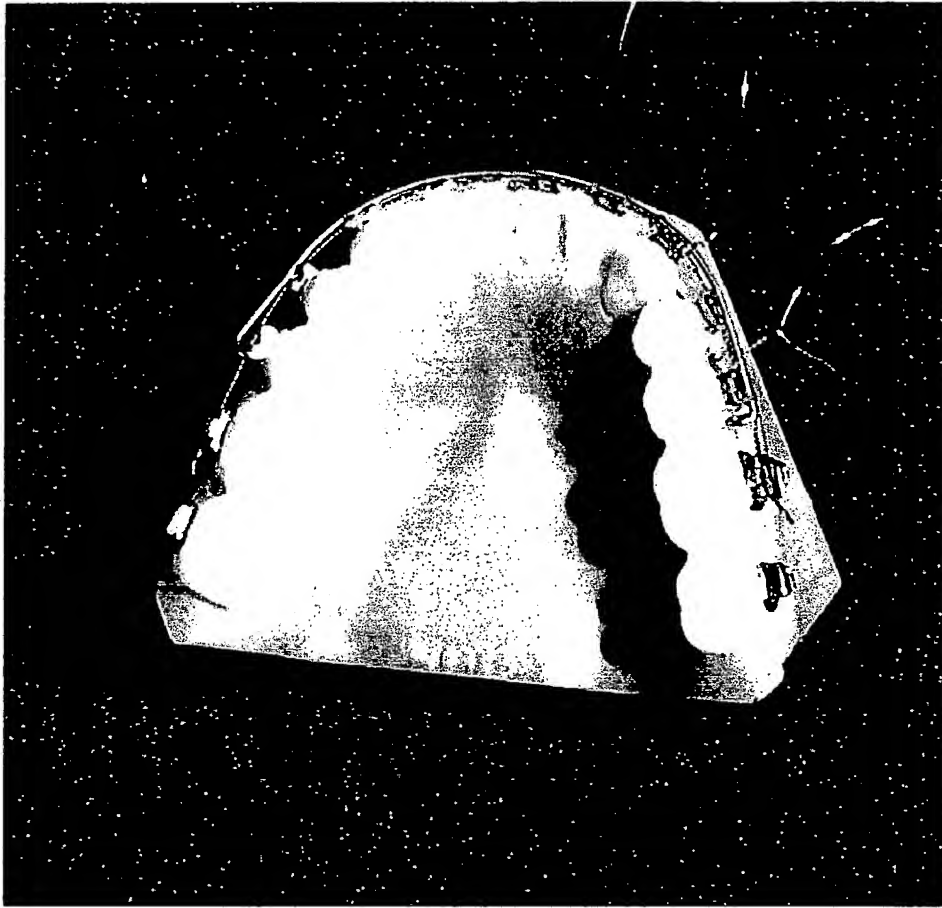


Photo 6. Arch bar attached to fixed orthodontic appliance from above. Note arch bar is outside bracket slot. The arch bar is accessory/piggybacked to the fixed orthodontic appliance.

Hopefully the photographs are informative.

The specification, drawings and claims accurately describe the above photos.

Respectfully submitted,

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